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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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PHILIP S. JOHNSON
JOHNSON & JOHNSON
ONE JOHNSON & JOHNSON PLAZA
NEW BRUNSWICK, NJ 08933-7003

EXAMINER	
LOPEZ, CARLOS N	
ART UNIT	**PAPER NUMBER**
1731	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/623,894	KEIDAR, YARON	
	Examiner	Art Unit	
	Carlos Lopez	1731	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) *8-13,18 and 19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,14-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/19/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 4, 5, 14-15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (2002/0059708) in view of Gingerich et al. (4,135,109).

3. Regarding claims 1, 4, and 5, Zhang discloses a method for making a piezoelectric transducer comprising the steps of:

machining a ceramic blank, coating the ceramic with a metallic layer, and transforming the ceramic material forming the ceramic into a piezoelectric crystal. Zhang discloses it is known in the art to fabricate hollow sphere ceramic electroactive transducers by machining and grinding a bulk ceramic into hemispheres (paragraph [0016]). Zhang fails to disclose machining the hollow ceramic into a tubular configuration. However, Zhang discloses it is desirable to have a hollow ceramic electroactive device in the form of a tube, since in the process of coating the shaped core, he discloses cylinder cores for tubes (paragraph [0059]). Accordingly, it would have been obvious to one skilled in the art at the time the invention was made that in the process of machining and grinding a bulk ceramic into a a hollow ceramic electroactive transducer, a tube in lieu of a sphere configuration could be formed, since it has been taught by Zhang a tubular configuration is desirable.

Zhang further discloses the ceramic is coated with an outer electrode (paragraph [0057]) and inner electrode (paragraph [0053]). The outer electrode was coated onto the surface of the ceramic by contacting the sintered surface with the metal, or a metal ink through sputtering or dipping. Coating the ceramic with the inner electrode was preformed by coating the ceramic onto the electrode surface. However, it can be deduced that since Zhang disclosed an alternate method of coating the surface of the ceramic tube to form an outer electrode, that one skilled in the art could have also used the same method to coat the inner surface of a ceramic, such as the hollow ceramic that was created by machining and grinding a bulk ceramic, as disclosed by Zhang. Accordingly, it would have been obvious to one skilled in the art at the time the invention was made that if a machined ceramic was utilized, as taught be Zhang, and an inner electrode was desired on the hollow ceramic, as taught by Zhang, a coating process such as sputtering or dipping used for the outer electrode, as taught by Zhang, could also be utilized for the inner electrode. Zhang further discloses after the coating process, the ceramic shell is then poled with an electric field, which completes the process of fabricating a hollow ceramic electroactive transducer. Zhang fails to further disclose machining a plurality of helically intertwined outer electrodes, each outer electrode being associated with a functionally discrete transducer segment. However, Gingerich also discloses a hollow piezoelectric transducer where the inside and outside walls of the cylinder are covered by electrodes (Col. 2 lines 46-47), such that after machining of the threads maintains its electrode 24 while each thread 22 includes an appropriate electrode 26. Gingerich discloses this type of transducer reduces, if not

completely eliminates the undersirable effects of extraneous modes (Col. 2 lines 33-34). Further, Gingerich discloses when a piezoceramic cylinder is diced it alters the surface thereof so as to present a multitude of isolated elements or posts. Additionally, Gingerich discloses the threads may be cut by any one of several known manufacturing methods for cutting threads (Col. 2 lines 66-67). Gingerich and Zhang are analogous art, because they are from the same field of endeavor, which includes the use of hollow ceramic electroactive devices. Accordingly, it would have been obvious to one skilled in the art at the time the invention was made to further process the hollow electroactive transducer of Zhang, since it has been taught by Gingerich forming a plurality of helically intertwined outer electrodes in a hollow ceramic transducer by machining spiral grooves into the transducer, will reduce, if not completely eliminate the effects of extraneous modes.

Regarding claims 15 and 16, Gingerich further discloses the transducer further comprises the step of applying a potting compound 40 such as polyurethane inside and outside the surfaces of the cylinder. The "matching layer" has been broadly interpreted to include the potting compound 40, such as a polyurethatne, and the "laminating" has been broadly interpreted as applying a coating, such as the potting compound 40, to the inside and outside surfaces of the cylinder (Col. 3 lines 17-22).

Regarding claim 14, Gingerich discloses a backing member 32 such as a foam plug provided to act as a supporting means for the cut cylinder and the cylindrical piezoceramic element is a thin-walled. Therefore it can be deduced, since the element is thin-walled and requires a foam plug for support after the grooves are cut, that the

thin-walled tube may require support during the machining process. This could easily be determined through routine experimentation during the machining process. Additionally, supporting any type of material during a machining process is common practice. Accodingly, it would have been obvious to one skilled in the art at the time the invention was made to use a mandrel for additional support during the machining process, since it has been disclosed by Gingerich the ceramic is thin-walled and requires support.

4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over over Zhang et al. (2002/0059708) in view of Gingerich et al. (4,135,109) as applied to claims 1 and 15 above and as further evidenced by Licari (Coating Materials for Electronic Applications). Gingerich discloses applying the potting compound to the piezoelectric transducer, but fails to disclose how the potting compound 40 is applied to the piezoelectric transducer, such as a process selected from the group of spray coating, dip coating, chemical vapor deposition, plasma coating, co-extrusion coating, spin coating and insert molding. However, it is well known in the art to coat electrical and electronic parts with a wide variety of methods, such as spraying and dipping methods and deposition, as evidenced by Licari (pgs. 227-229). Accordingly, it would have been obvious to one skilled in the art at the time the invention was made to apply any of the known coating application techniques to applying a matching layer, such as potting compound to the piezoelectric transducer, such as spray coating, dipping, deposition, spinning, extrusion, etc., in the process of Gingerich, since these coating methods are well known in the art, as evidenced by Licari.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (2002/0059708) in view of Gingerich et al. (4,135,109) as applied to claims 1 and 15 above and as further evidenced by Koshal (Manufacturing Engineer's Reference Book, copyright 1993. Zhang discloses the ceramic is machined, and Gingerich discloses machining the grooves, but fails to disclose the details of the machining, such as the machining comprises core drilling and turning the blank using a CNC machine. However, one skilled in the art could deduce to make a tube from a ceramic blank would require drilling a core into the blank, and to cut the threads would require turning the blank, as evidenced by Koshal. Koshal discloses CNC machining centers that combine operations such as mills, drills, small borers and shaping machines. Accordingly, it would have been obvious to one skilled in the art at the time the invention was made to machine the blank with a core drilling and turning the blank using a CNC machine, since it is well known method of machining, as evidenced by Koshal.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (2002/0059708) in view of Gingerich et al. (4,135,109) as applied to claims 1 and 15 above and as further evidenced by Koshal (Manufacturing Engineer's Reference Book, copyright 1993, as applied to claim 2 above, and further in view of Tomaru (JP06-120062), Corbett et al. (5,855,049), and Hiller et al. (20020136969). Zhang discloses the ceramic is machined, and Gingerich discloses machining the grooves, but fails to disclose the details of the machining, such as drilling and turning the blank comprising utilizing a quadruple YAG laser at about 700 nm wavelength, hooked to a rotary mandrel cad/cam machine. However, one skilled in the art could deduce to make a

tube from a ceramic blank would require drilling a core into the blank, and to cut the threads would require turning the blank, as evidenced by Koshal. Koshal discloses CNC machining centers that combine operations such as mills, drills, small borers and shaping machines and additionally discloses the use of CAD/CAM in Fig. 14.18 in machines for drilling, milling, turning, etc. Further, Tomaru discloses forming on a surface of a cylindrical rod using laser machining to trim a spiral coil conductor on the ceramic coated rod. Tomaru and Gingerich are analogous art, since both disclose trimming a spiral into a ceramic coated tube. Tomaru also fails to disclose details of the laser trimming. However, Corbett et al. discloses in an alternate method of producing an ultrasonic transducer, the use of a quadrupled Nd:YAG laser to drill a set of open vias. Corbett and Gingerich are analogous art because they are from a similar problem solving area, such as methods of producing transducers. Corbett et al. fails to disclose the wavelength of the laser is at 700 nm, however, it is well known in the art alternate wavelengths can be used, since it is known the YAG lasers typically have wavelengths of between 700 and 900 nm, as evidenced by Hiller (paragraph [0037]). Therefore, it can be deduced alternative wavelengths can be utilized. Corbett and Hiller are analogous art, since both disclose the use of YAG lasers and their corresponding wavelengths. Accordingly, it would have been obvious to one skilled in the art at the time the invention was made wherein the step of core drilling and turning in the process of Zhang in view of Gingerich, as evidenced by Koshal, a quadruple YAG laser is utilized, as taught by Corbett, at a wavelength of about 700 nm, as taught by Hiller, hooked to a rotary mandrel CAD/CAM machine, as evidenced by Koshal, since all of the

references teach various embodiments involved in the art of machining that would easily be combined by one skilled in the art of machining to produce the transducer having a plurality of intertwined helical transducer segments disclosed by Zhang in view of Gingerich.

Response to Arguments

Applicant's arguments filed 11/23/05 have been fully considered but they are not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicant is arguing the Gingerich reference individually when the rejection is the result of the combined teachings of Zhang and Gingerich.

Applicant is arguing that the present application has its own connection pad and electrical connection and is not separated into functionally discrete segments. However, the claims only recite that each outer electrode be associated with a functionally discrete transducer segment. A limitation that clearly reads on Gingerich having each electrode 26 with a thread 22 which is deemed as the claimed discrete transducer segment. Furthermore In response to applicant's argument that the reference fails to show each transducer segment having its own connection pad and electrical connection, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the

specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carlos Lopez whose telephone number is 571.272.1193. The examiner can normally be reached on Mon.-Fri. 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571.272.1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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